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A portfolio of natural places: Using a participatory GIS tool to compare the appreciation and use of green spaces inside and outside urban areas by urban residents

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h i g h l i g h t s

- Urban residents appear to have a 'portfolio of natural places'.
- The portfolio consists of favourite places nearby that are rated lower but visited quite often.
- It also consists of natural places farther away that they find highly attractive but visit less often.
- This approach offers a more complementary view in addition to the compensation hypothesis.
- To meet the needs of urban residents more than the immediate urban context needs to be considered.

a b s t r a c t

Green space at different distances is important for the wellbeing of urban dwellers. However, since these different types of green space are, for the most part, investigated in separate studies, it is difficult to disentangle how the use and appreciation of nearby and more distant nature by urban dwellers is related. To address this issue, we conduct an analysis in which we directly compare the appreciation and use of green spaces at four different spatial levels: neighbourhood, region, national, and world level, for urban residents in the Netherlands, Germany and Denmark. For this we use a quantitative, internet-based, participatory GIS method. The relationship between the use of local and more distant green spaces by urban dwellers has generally been addressed in terms of compensation. Our results indicate that this relationship can also be viewed in a complementary way. Urban residents appear to have a 'portfolio of natural places'. This portfolio consists of favourite places nearby that are rated lower but visited quite often, and natural places that they find highly attractive but are located farther away and visited less often. Local favourite places offer basic access to green and nature while other more distant natural places offer a larger variety of qualities and recreational possibilities. Results also indicate that, in order to meet the needs of urban residents, more than the immediate urban context needs to be considered in urban planning.

1. Introduction

At present, more than 50% of the global population lives in urban areas and the world's urban population continues to grow rapidly (UN, 2014). The urbanisation trend raises many challenges in relation to the protection of green space and natural areas in and around cities (Bekessy et al., 2012; Tzoulas et al., 2007).

Green spaces in cities allow urban residents easy access to a natural environment in their everyday lives; and for some residents who are unwilling or unable to travel to distant nature areas, these spaces may even be the only possible 'escape' to nature (Baur & Tynon, 2010). To date, studies have focused for instance on the factors influencing the use of urban green space (Schipperijn, Stigsdotter, Randrup, & Troelsen, 2010) or on the relation between park characteristics and benefits for wellbeing offered by urban parks (Brown, Schebella, & Weber, 2014). There is growing empirical evidence for the positive relationship that exists between green spaces and wellbeing also more in general (Hartig, Mitchell, De

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Vries, & Frumkin, 2014; Maas, Verheij, Groenewegen, De Vries, & Spreeuwenberg, 2006; Mitchell & Popham, 2008; Van Den Berg, Hartig, & Staats, 2007; Van den Berg et al., 2015). Various authors have shown that green spaces promote wellbeing, for example, by having psychological restorative functions (e.g. Chiesura, 2004; Ulrich et al., 1991), offering opportunities for physical activities (Brown et al., 2014), and providing a place for social interaction (Coley, Kuo, & Sullivan, 1997; Kazmierczak, 2013).

In the literature urbanisation is also linked to an appreciation for nature areas situated farther away from cities. Since urbanisation tends to be associated with increased prosperity, it also leads to a rise in spatially wider ranging and more varied recre-ational and touristic activities (Balmford et al., 2009; Williams, 2009). Urbanisation has also been related more specifically to a rising interest in nature-based tourism, based on the idea that natural areas offer a welcome contrast to the stress of everyday city life (Akama, 1996). Indeed, enjoying the natural environment and escaping from urban living and daily working life have shown to be important motivations for tourists visiting nature parks (Garms, Fredman, & Mose, 2016; Kim, Lee, Uysal, Kim, & Ahn, 2015). Also rest and relaxation, enjoying the company of family or friends, novelty and self-fulfillment are found to be motivations for nature-based tourism (Davis, Daams, Van Hinsberg, & Sijtsma, in press; Kastenholz & Rodrigues, 2007; Kim et al., 2015; Meng, Tepanon, & Uysal, 2008). Nature-based tourism activities have also been related to health and wellbeing benefits (Kim et al., 2015). In a study by Cole (2010) considerable stress reduction and mental rejuvenation were reported by visitors to wilderness areas. It appeared that day trips had similar effects compared to overnight trips.

Given the aforementioned findings, one can argue that green spaces at different spatial levels and at different distances play a role in the wellbeing of urban dwellers. But how to achieve a more integrated perspective? Currently, different types of green space are usually investigated in separate studies, often even in different strands of the literature, and it is difficult to disentangle how urban dwellers' use and appreciation of nearby and more distant nature is related. Matsuoka and Kaplan (2008) call for a fuller approach in future research on the needs of urban dwellers: "With the rapid urbanisation of the countryside around the world, it is important to examine issues of scale in terms of human benefits. There is a tension between protecting large-scale tracts of land [farther away] and providing small areas [nearby] that afford frequent nature opportunities. How do communities approach this tension (p. 15)?" It therefore seems relevant to integrate the different types of green space and their contributions to urban dwellers' wellbeing into one study in order to directly compare their appreciation and use at different spatial levels. This is what we aim to do in this paper.

In studies that do relate the use of both local and distant green space, the relationship is often viewed in compensatory terms. The assumption behind the so-called compensation hypothesis is that people have basic needs for experiencing natural settings, and if they cannot satisfy these needs sufficiently in the primary residential environment, more travel to green places located further away will take place, with visits to exurban green space, second homes or other long-distance leisure excursions (Hall & Page, 2014; Strandell & Hall, 2015). In a recent study, Sijtsma, De Vries, Van Hinsberg, and Diederiks (2012), indeed found that people living in grey urban areas, with a scarcity of urban green space available for recreational walking, spend more holiday nights away from home. Strandell and Hall (2015) also found support for the compensation hypothesis, but discovered complications as well: even though they demonstrated that when building density increases or access to a private garden is reduced, the use of second homes increases, they

did not find a relationship between use of second homes and access to green areas.

1.1. A portfolio of places?

The studies which investigate the compensation hypothesis often lack clear indicators for the meaning of green space in terms of wellbeing. They often look at density or distance to green spaces within the urban context and subsequent number of leisure travelling kilometers, use of second homes, and number of holiday nights spent away from home for a distant nature experience (e.g. Módenes & Lopez-Colas, 2007; Sijtsma, De Vries et al., 2012; Strandell & Hall, 2015). We suggest that deeper understanding of the use and appreciation of different types of green spaces will shed light on their role in the wellbeing of urban residents. It may be that the relationship between use of local and more distant green spaces can also be viewed in a more complementary way in addition to the compensation perspective.

In the rural context, evidence for a complementary view has been found in a policy-oriented qualitative study conducted by Natural England (2009). Their results indicate that people regard landscapes differently in terms of the quality of their experience, and that most people had a 'portfolio of places' for different needs and moods. The foundation of the portfolio is represented by places nearby and easily accessible where the basic 'quick hits' of landscape can be obtained: the feeling of being away, seeing grass, trees, some form of nature, places that deliver day-to-day stress-relieving effects. A quick hit could be a local park, a regular dog walking route or a quick walk along a river with a good path. For many people, this basic nature experience close to home appeared to be highly valued and was mentioned as crucial to their own wellbeing. The green places higher up the scale were regarded as having greater aesthetic qualities, as more varied, providing a greater range of experience, but these would also involve a little more travel. Finally, and probably visited least often, are those so-called 'magical' places that deliver once-in-a-lifetime experiences, and which 'blow your mind' (Natural England, 2009).

Until now, we know of no study in the scientific literature that has explored a wider view on the importance of multiple green spaces at different spatial levels. In this paper the key question is: can we make a first attempt to empirically explore whether urban dwellers also have a portfolio of natural places and describe what such a portfolio of places of urban residents looks like? For the purposes of our study we use a large scale quantitative and geographical public participatory GIS (PPGIS) method. To gain insights into the 'portfolio of natural places' of urban residents, we directly compare the appreciation and use of green space at four different spatial levels: neighbourhood, region, national, and world level for urban residents in the Netherlands, Germany and Denmark. This direct comparison within a single study makes it easier to disentangle the different meanings of green spaces at different spatial levels for urban resident wellbeing, as opposed to other studies that often focus on either urban green space, peri-urban areas, or nature areas farther away from urban areas. The internet-based PPGIS tool, the 'Hotspotmonitor' (see also Sijtsma, Daams, Farjon, & Buijs, 2012; De Vries et al., 2013), enables us to collect very detailed spatial data in different cities in the three countries.

2. Methods

The data set applied in our study here has been collected using the web-based survey tool 'Hotspotmonitor' as briefly mentioned above. The Hotspotmonitor (HSM) was developed to measure social landscape values at different spatial scales (De Vries et al., 2013; Sijtsma, Daams et al., 2012) (www.hotspotmonitor.eu).

Recent technological developments such as Google Maps[®] have introduced new ways to measure social landscape values and preferences (Bearman & Appleton, 2012; Brown & Reed, 2012). The HSM is an example of participatory mapping, a refined means of capturing spatial information on social landscape values.

In the HSM, people are asked to answer the question ‘What places are very attractive, valuable or important to you?’ by placing a point-shaped marker on a map at the location of their highly attractive place. The only criterion is that the place be defined as natural in a broad sense: places featuring green, nature and/or water. It need not be located in the countryside, but may also be a place within a city or village. It can be a place respondents visit regularly but also a place they appreciate without yet having visited. The HSM has a location-based design (see Fig. 1) with participant’s residence as the starting point. Participants are asked to identify natural places they find attractive at four spatial levels, they can mark one place at each spatial level:

Local: a circle with a range of 2 kilometers from home. This range is chosen to indicate the immediate residential environment, the distance for an evening walk for instance.

Regional: a circle with a range of 20 kilometers from home. This range is chosen to indicate the wider living environment, a distance which can be covered by a short trip by a car or a suitable distance for a cycling tour.

National: the whole of the country. As countries play a prominent role in both policy making and behavior of people this range is distinguished

‘The world’. Since more and more people travel internationally this last and highest level is included.

Every individual respondent marks point-shaped places. Using GIS clustering techniques these points could be grouped together to form highly-appreciated polygons, allowing various types of analysis (De Vries et al., 2013; Daams, Sijtsma, & Van der Vlist, 2016), but given the focus of this paper here we only work with the point-shaped markers.

The HSM also includes questions about the benefits the places provide to respondents; the needs they fulfil. After marking a place, respondents indicate its attractiveness (on a scale of 1 to 10). They also specify how often they visit it, and what activities they undertake there by choosing one or more from a list of activities. Furthermore, they are asked which qualities were important for them to mark this place as attractive. The set of 13 qualities from which one or more could be chosen (for instance: ‘silence’, ‘unique flora/fauna’, ‘farming in the area’ or ‘it’s like looking in the past’) is based on landscape research by Coetier (1996) and Brown and Reed (2000) and was used before in De Vries et al. (2013). In addition to this, the respondents were asked to describe the attractiveness of the place in their own words. After having placed all markers and answered the marker-specific questions, general questions follow on demographic characteristics: age, gender, education, and household composition.

The data for this paper were gathered by conducting the HSM survey among members of internet panels of the market-ing research agency (GfK) in three countries: the Netherlands, Germany and Denmark, in the summer of 2013. GfK can generally deliver completely representative sets of respondents for the three countries. However, our research had a strong spatial focus. It aimed for respondents to be spatially evenly spread across the three countries. Respondents were therefore equally spread across each country: about 1/12 from every one of the 12 Dutch provinces, 1/16 from every one of the 16 German Bundesländer, and 1/5 from every one of the 5 Danish regions. In each area we aimed for 50% of the respondents living in the capital city, while the other 50%

Table 1

Background characteristics of the respondents (%) (N=3763).

Gender	%
Male	50
Female	50
Age	
≤25	13
26–35	24
36–50	31
51–65	24
65<	8
Level of education	
Lower or middle level of education	55
Higher education	45

resided elsewhere in the regions. Splitting the sample geographically in this way, and having only limited numbers of respondents in every spatially distinct part has caused some (acceptable) loss of general representativeness. There was no loss of gender representativeness, but we saw for instance that in the Danish sample higher educated people were overrepresented.

Our focus in this paper is on urban residents, so for this reason we have selected from the total sample people living within ‘functional urban areas,’ as defined by the OECD (Brezzi, Piacentini, Rosina, & Sanchez-Serra, 2012). The OECD developed this definition of urban areas to provide a common base to understand urban areas and to have an internationally applicable definition of urban areas. We used this definition because of the international composition of our sample. The definition of urban areas by the OECD uses population density to identify urban cores and travel-to-work flows to identify the hinterlands whose labour market is highly integrated with the cores (Brezzi et al., 2012). Given our study emphasis on urban residents, we have selected only people living in the densely inhabited core areas, and have obtained a selection of 4222 respondents. After checking respondents’ data, however, it appeared that some of the distances from home address to neighbourhood and region markers far exceeded the 2 km and 20 km boundaries as suggested by the survey. Therefore, for both spatial levels we removed the 1% of markers with the largest distance to the home marker. It is noteworthy, however, that we did not limit the choice distance to 2 km and 20 km because the placement of markers outside these boundaries can also signify a lack of attractive green space within the living environment. We also removed national markers placed beyond country borders. After cleaning and verifying the data, we have selected only the respondents with complete information on markers at four spatial levels. Our final selection of urban residents consists of 3763 respondents (Germany: 2548; Denmark: 499; Netherlands: 716). Fig. 2 depicts the residential locations of our respondents, and Table 1 gives descriptive statistics for the sample.

For the data analysis we mainly apply descriptive statistics. The answers for the different spatial levels are compared using a Chi-square test and one-way analysis of variance (ANOVA).

3. Results

3.1. Nature at different spatial levels

As discussed in Section 2, Hotspotmonitor survey respondents were asked to indicate the places they think are highly valuable or attractive by placing a marker on a map at the location of their highly attractive place. They were asked to set markers at four spatial levels, using residential location as the starting point. For each respondent we have thus obtained five spatial markers: the home and four favourite natural places. To illustrate, we use the city of Berlin as an example and include four maps showing the

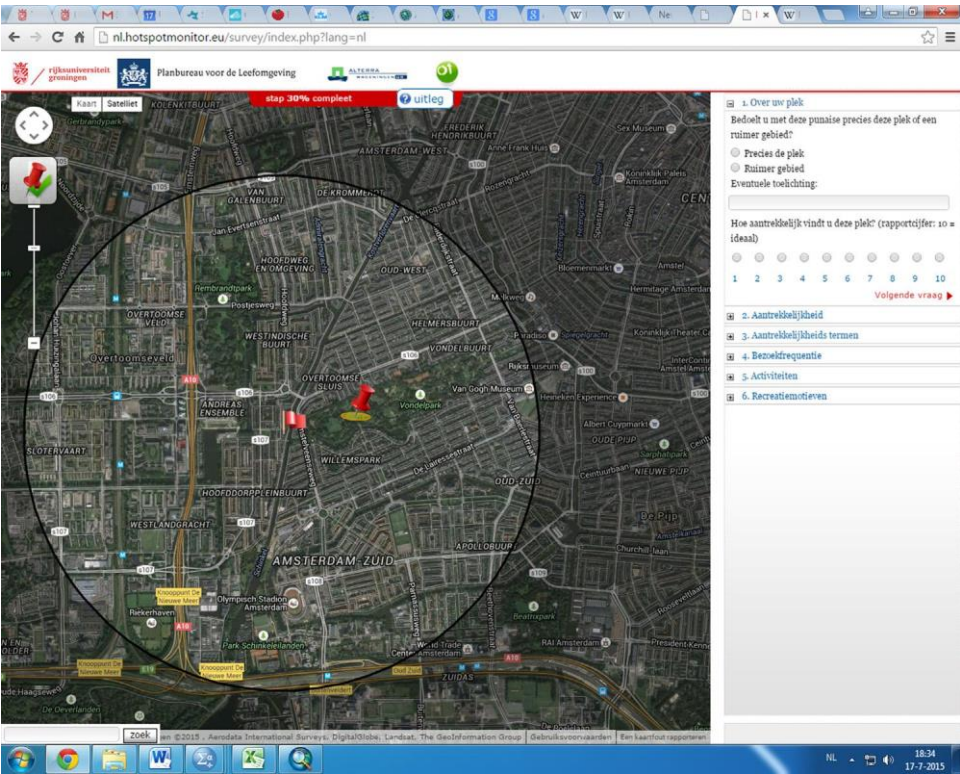


Fig. 1. Screenshot of the HSM at the moment a marker is placed.

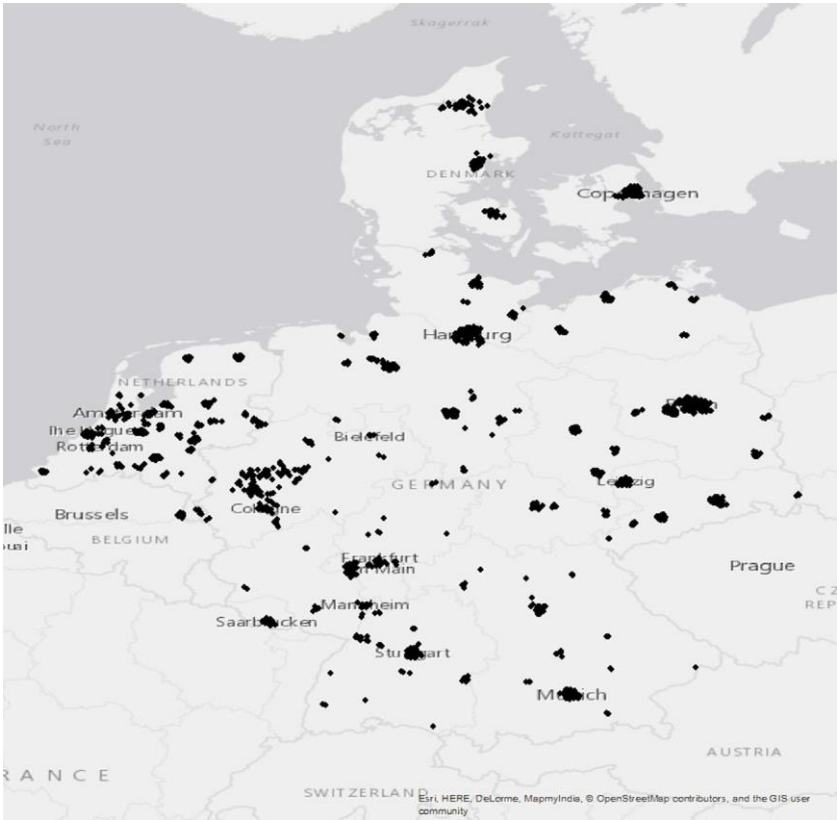


Fig. 2. Residential locations of our data set of 3763 respondents.

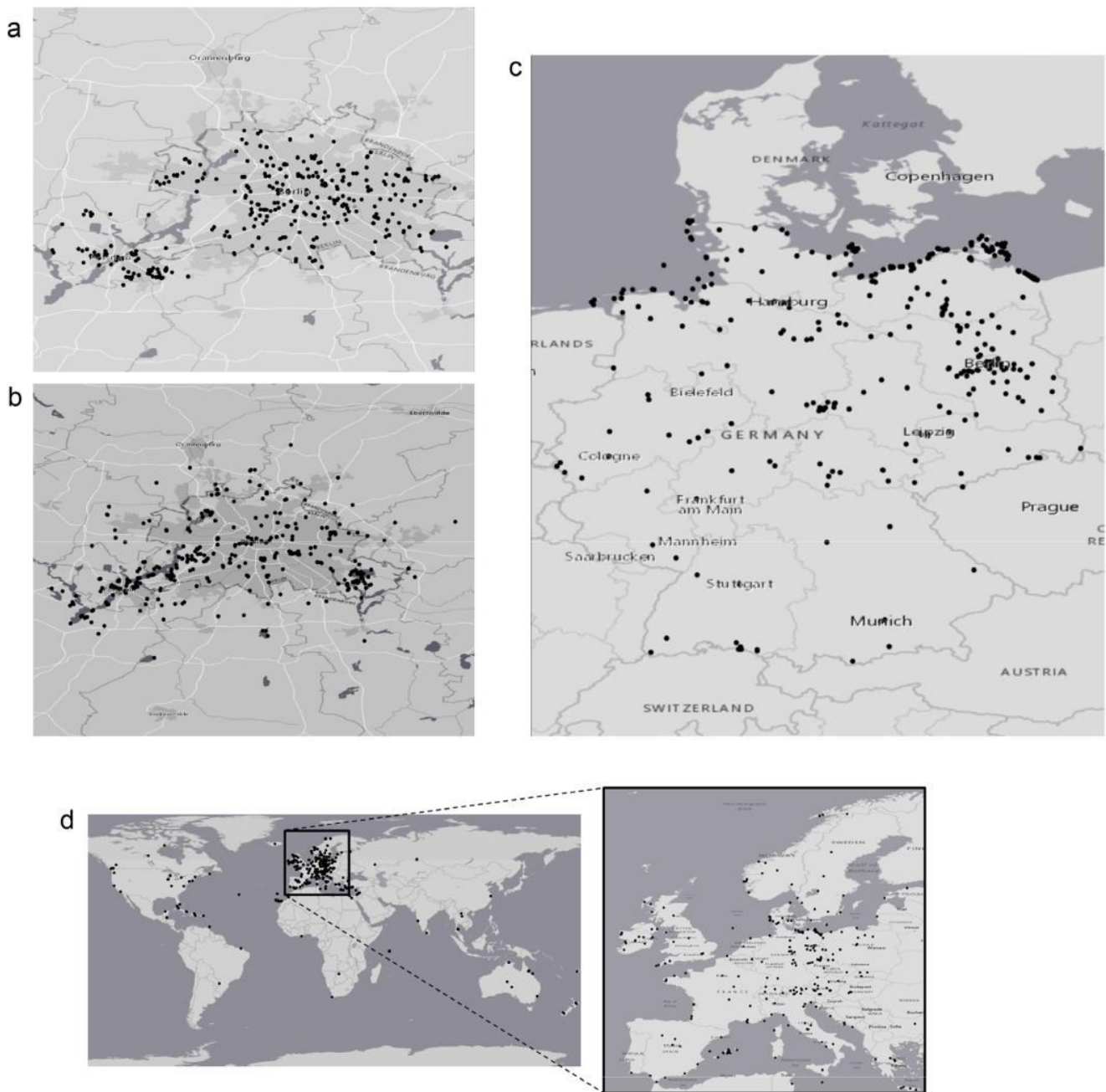


Fig. 3. a. Markers indicating local favourite natural places of Berlin residents ($n = 376$). b. Markers indicating regional favourite natural places of Berlin residents ($n = 376$). c. Markers indicating national favourite natural places of Berlin residents ($n = 376$). d. Markers indicating worldwide favourite natural places of Berlin residents ($n = 376$).

favourite natural places at the four spatial levels of Berlin residents (Fig. 3a–d).

3.2. Rating of attractiveness, distance to home and visiting frequency

On each spatial level, after marking a place, respondents indicate its attractiveness on a scale from 1 to 10. The ratings for the different levels are shown in Table 2. All average scores are quite high, but since respondents were asked to rate their most attractive places, this may not be surprising. Yet it is interesting to observe that the local favourite place (within 2 km from home in the urban environment) receives a rating, on average, of 7.7. However, the ratings at the different spatial levels differ significantly. The rat-

Table 2

Rating per spatial level.

Level	Rating (mean, 1–10)
Local	7.7 ^a
Regional	8.1
National	8.4
World	8.6

^a ANOVA $F = 214,799$, $p < 0.001$.

ing increases as the spatial level widens; the favourite place at the world level is rated 8.6 on average, a positive difference of nearly one point compared to the local level.

Table 3
Distance to home per spatial level (mean and quartiles).

Level	Distance to home (km)				
	Mean	25%	50%	75%	100%
Local	1,8 ^a	0,8	1,5	2,4	20,2
Regional	13,2	6,4	11,9	19,2	34,8
National	275,9	88,3	201,0	384,2	1287,1
World	3361,2	767,2	1628,0	3293,3	22.493,7

^a ANOVA $F = 2006,600$, $p < 0.001$

Table 3 shows the distances to home address for favourite places at the different spatial levels. For local and regional levels the distances are, to a certain extent, limited by the survey design; respondents were asked to mark a place within 2 km and 20 km respectively, but as mentioned above, it was technically possible to place a marker beyond 20 km as well. We find that the distance to home is on average 1,8 km for local favourite natural place and 13,2 km for regional place. The national favourite place is situated considerably farther away, on average, 276 km from home, and the favourite place at world level is found on average to be greater than 3.000 km from home. When we combine the distance levels with the rating, the two average distances indicate urban residents' strong appreciation for natural places located far from home.

Respondents were asked how often they visit these favourite places. Visiting frequencies are shown in Table 4; here we see that the local favourite natural place is visited most often: 14% of respondents visit it daily, 34% visit weekly and 24% monthly. The regional place is visited more on a monthly timescale: (26%) or a few times per year (42%). The national place is visited by 35% of respondents a few times per year, 28% visit once per year (yearly). The favourite place at world level is visited markedly less often: 27% visit it once per year, and 48% of respondents visit it rarely.

Based on rating, distance and visiting frequency, we can confirm that the idea of a 'portfolio of natural places,' as put forward by Natural England (2009) based on a qualitative study with rural residents, also applies to people living in urban areas. Our respondents have favourite places nearby, which are, when looking at the on average lower rating, 'less special', but which they visit quite often. In addition to that, they have natural places which they find really attractive, but which are located on a larger distance and which are visited less often or even rarely by them.

3.3. Qualities of green spaces

To gain insight into this 'portfolio of natural places,' we next discuss the answers to the question 'why is this place attractive to you?' People could select several options and results are set out in Table 5, with answers provided by at least 20% of respondents. We can clearly see in the table that as the spatial level expands outward, more qualities are mentioned by (20%+) of respondents, which probably partly explains the higher ratings for more distant places. It seems that these natural places indeed have much to offer.

The answer 'green, nature' can be understood as a basic quality of a green, natural place. This quality is essential for the local favourite place: more than 70% of respondents marked this answer. The portfolio of places of rural residents (Natural England, 2009) also confirmed that local places offer this important basic access to these qualities. 'Recreational options' are also sought after in the neighbourhood natural place (38%). Other qualities at this level include 'water', 'silence', 'nature has its free course' and 'everything in the landscape fits together.' Our findings show too that the regional favourite place offers easy access to the 'basic' quality 'green and nature' (71%). Recreational options are valued higher in

Table 4
Visiting frequency of favourite natural places per spatial level.

Visiting frequency	Level			
	Local	Regional	National	World
Never	2	2	3	11
Rarely	3	5	19	48
Yearly	2	7	28	27
Few times a year	21	42	35	10
Monthly	24	26	9	2
Weekly	34	15	4	1
Daily	14	3	2	1
	100%	100%	100%	100%

² = 8766,731, $p < 0,001$.

the regional favourite place and are mentioned by a slightly larger share (48%) of respondents.

It is noteworthy that the quality 'variation in the landscape', not mentioned substantively for the local place, is important to more than 30% of respondents in their choice of regional natural place. In conjunction with the finding that more qualities reach the threshold of 20%, one could say that these places offer greater variety of natural qualities to urban people. For the natural place at national level, respondents selected 'green, nature' at a slightly smaller share (62%). At the same time, qualities such as 'variation in the landscape' (44%), 'everything in the landscape fits together' (42%) and 'unique flora and fauna' (34%) are mentioned more often, indicating that these favourite places at national level offer richer natural and landscape qualities. Recreational options and the presence of water are also important. Characteristics of favourite natural places at world level do not differ much from the preferred qualities at national level. The basic quality 'green, nature' is mentioned even less often here (56%), but at world level water and recreational options are key qualities. Variation in the landscape is indicated by more than 50% of respondents as essential to their favourite place at world level. Landscape variation is apparently a significant quality that causes natural places to stand out.

3.4. Activities

Respondents in the survey were also asked to identify the activities they undertake at their selected places. They could specify more than one activity. Results are listed in Table 6. Walking is highlighted as a main activity in the local favourite natural place (66%). The local place appears to be significant for physical activities in general, with cycling (20%), running (20%) and walking the dog (19%) all ranking highly. Relaxing and sunbathing (34%) and nature watching (25%) are also mentioned frequently at local level, thus acknowledging the restorative, stress reducing effects of direct contact with nature. However, activities related to social interaction feature less prominently at local level, with 'café, terrace' mentioned by 15% of respondents, and 'picnic/bbq' mentioned by 14%.

In the selected place at regional level, physical activities such as walking (66%) and cycling (20%) continue to be important. The 'relaxing' element and 'direct contact with nature' both become more prominent at this spatial level. The social activity 'café, terrace' is more appreciated here than at local level. When we examine the favourite natural place at national level, walking remains the most preferred activity. Here however, 'swimming' appears in the top five activities. Activities related to the stress reducing effect of nature rate even higher at this level, 'relaxing, sunbathing' (51%) and 'nature watching' (42%). At national level, the social activity 'café, terrace' has greater appreciation (37%). Lastly, at world level the list of activities is closely comparable to the national level.

Table 5

Qualities mentioned most often per level of scale (≥20%).

Rank	Local	Regional	National	World
1	Green, nature 74%	Green, nature 71%	Green, nature 62%	Green, nature 56%
2	Recreational options 38%	Recreational options 48%	Recreational options 56%	Water 56%
3	Water 35%	Water 42%	Water 54%	Recreational options 52%
4	Silence 28%	Nature has its free course 37%	Nature has its free course 44%	Variation in the landscape 52%
5	Nature has its free course 21%	Silence 32%	Variation in the landscape 42%	Nature has its free course 45%
6	Everything in the landscape fits together 20%	Variation in the landscape 31%	Everything in the landscape fits together 40%	Everything in the landscape fits together 44%
7		Everything in the landscape fits together 30%	Open space 38%	Unique flora and fauna 43%
8		Open space 29%	Silence 36%	Open space 38%
9		Unique flora and fauna 22%	Unique flora and fauna 34%	Silence 36%
10		There are few people around 20%	There are few people around 23%	There are few people around 28%
11			Few signs of civilisation 20%	It's like looking into the past 24%
12				Few signs of civilisation 20%

Table 6

The 10 most mentioned activities per level of scale.

Rank	Local	Regional	National	World
1	Walking 66%	Walking 66%	Walking 73%	Walking 69%
2	Relaxing, sunbathing 34%	Relaxing, sunbathing 38%	Relaxing, sunbathing 51%	Relaxing, sunbathing 56%
3	Nature watching 25%	Nature watching 31%	Nature watching 42%	Nature watching 44%
4	Cycling 20%	Café, terrace 25%	Café, terrace 37%	Café, terrace 39%
5	Running 20%	Cycling 20%	Swimming 29%	Swimming 35%
6	Walking the dog 19%	Walking the dog 19%	Picnic/bbq 24%	Touring by car 28%
7	Café, terrace 15%	Picnic/bbq 19%	Cycling 20%	Picnic/bbq 23%
8	Picnic/bbq 14%	Swimming 16%	Walking the dog 19%	Playing 15%
9	Playing 13%	Running 15%	Playing 18%	Walking the dog 14%
10	Nature watching (plants) 11%	Playing 14%	Touring by car 16%	Running 12%

Table 7

Three examples of quotes describing the attractiveness of the place for each of the four spatial levels.

Local

It quiets the soul to sit and look over the water. Favourite season is autumn, with a flask, a book and a blanket to cover the legs. But all seasons are good on the beach, sun and warmth in the summer as well as cold in winter. The water is the most important.

You are in the city, but still at a quiet place. Nicely along the water, there are hardly cyclists (because they are not allowed there), once in a while you see a runner, someone walking their dog or an older man or woman. Lovely quiet, and still close to home.

It is a place with a lot of green and water. The area, which is freely accessible during the year, offers the perfect place in every season, for sporting, meeting friends, walking with children, barbecuing (in summer), etc. The part you have to pay for in summer (Great Garden, Mountain Garden) is laid out beautifully and offers many attractions like the illumination and the 'little festival.'

Regional

If the weather is nice and you are with a boat on the river in the old sand extraction hole and you stay there overnight, in the evening you only hear the sound of frogs and crickets and some other animals. Even a busy person like me settles down then, lovely! You really do not need to go far on holiday, because 15 minutes from home you find everything you can wish for

Water, green, nice for jogging and walking. In summer there is the Mascheefestival. Yet, Eilenriede is the forest in the city, really unique and the top destination when you want to replace the urban experience for a nature and rural experience for a while

A nice very beautifully laid out lake which is very clean, you can barbecue there, you can always find nice and friendly people with whom you can have a good time. Appealing roads for cycling or walking. Very nearby, about 400 meters from the Northeast bank, there is also a nice mini-golf course with a fair price. There are two kiosks and a restaurant for eating and drinking around the lake, clean water and much more

National

Making a walk to the top of Skallingen and standing on the side of Grådyb is a grand experience, because you are quite on your own there and you can feel nature, and at the same time just see Esbjerg on the other side. The two months that you can walk to Langli it is a special experience to walk on the bottom of the sea and around the island, where you can see a lot of seals and birds, again together with the view towards the city of Esbjerg

Very beautiful privately-owned Alpine hut, unique nature and wildlife. You reach it in relatively short time from Munich and you can have fantastic days of recreation there. In the whole surrounding area there is very much to see and to discover. A great destination

A really awesome place, where the wonderful nature welcomes the people. It is a relief to come there, regardless whether it is summer with a lot of sun or winter with storm and it is ice-cold!

World

It is a far end of Europe with a view over the Atlantic Ocean. It feels like you are at the end of the world. The sea collides against the high rocks, seen from the rocks this is a beautiful view. Few people

For me this is the most beautiful place on earth, enclosed between the summits of the Himalayas, being alone with the local population who knows little to nothing about the trouble in the world

I love the island Sylt! I partly grew up on Sylt, my mother was born there and I love the landscape, the rough wind, the amazing air, the kind people – it is exceptionally beautiful, no matter what the weather is like!

3.5. Attractiveness as formulated by the respondents

In the Hotspotmonitor respondents are asked to describe in writing the attractiveness of their marked favourite places. Pre-sending a small selection of the of respondents' own perceptions enriches the systematic information presented in the tables above and adds 'colour' to the concept of a portfolio of natural places. So we carried out an explorative analysis of the open answers. For each spatial level we have selected the 25 longest answers, analysed them and transcribed their main elements. In Table 7 we include for each level three examples of answers which further illustrate the meaning of these natural places at different spatial levels.

Many of the same elements were repeated in the answers at all spatial levels. Respondents mentioned aspects such as nature, green, water, animals, seasons, and view. Also the idea of relaxing and the experience of quietness were important at all spatial levels. Furthermore, in a number of cases, the marked place was connected to childhood and other memories of the past. We give an example of this aspect in Table 7: "I love the island Sylt! I partly grew up on Sylt, my mother was born there and I love the landscape, the rough wind, the amazing air, the kind people." The open answers also show that these natural places stimulate myriad types of feelings and experiences which vary in intensity. We observe that the local place, within 2 km of home in an urbanised environment can also evoke strong feelings, as illustrated by the following quote: "It quiets the soul to sit and look over the water. Favourite season is autumn, with a flask, a book and a blanket to cover the legs. But all seasons are good on the beach, sun and warmth in the summer as well as cold in winter. The water is the most important."

However, some differences are observed among the open answers for the different spatial levels. For example, mainly the natural places at local and regional level are explicitly mentioned as a counterbalance to the stress of living in a high density and hustle-bustle urban environment. For instance: "You are in the city, but still at a quiet place. Nicely along the water, there are hardly cyclists (. . .), once in a while you see a runner, someone walking their dog or an older man or woman. Lovely quiet, and still close to home." From the answers it also becomes clear that natural places at different spatial levels offer space for various activities, but this is particularly the case at local or regional level. Physical activities are important, but so are the food-related activities picnicking or barbecuing: "It is a place with a lot of green and water. The area, which is freely accessible during the year, offers the perfect place in every season, for sporting, meeting friends, walking with children, barbecuing (in summer)." The previous quote also illustrates that favourite natural places not only include a quiet environment, in particular at local and regional level, but they also provide a pleasant atmosphere conducive to meeting people.

As mentioned earlier, from the open answers of respondents becomes clear that natural places at different spatial levels evoke various feelings and experiences. However, it seems that the places marked at national or world level provoke even deeper, intense feelings and experiences, in for example: "It is a far end of Europe with a view over the Atlantic Ocean. It feels like you are at the end of the world. The sea collides against the high rocks, seen from the rocks this is a beautiful view. Few people." The wording used is also different; it seems that for the places at national and world level more descriptive adjectives are used, including 'fantastic', 'unique' and 'most beautiful.' Previously, in the discussion of closed answers describing the attractive qualities of places, we observed that 'variation in the landscape' seemed to be an important element at higher spatial levels. This aspect of variation also appears in the open answers, where at national and world level respondents reply several times that different activities can be undertaken or that several different landscape types come together, as explained by: "Very beautiful privately-owned Alpine hut, unique nature and wildlife. You reach it

in relatively short time from Munich and you can have fantastic days of recreation there. In the whole surrounding area there is very much to see and to discover. A great destination."

4. Discussion

In this paper we have made a first attempt to empirically explore whether urban dwellers have a portfolio of natural places and to describe what such a portfolio of places of urban residents looks like. The results from this study may support policy makers assessing the impact of green space at different spatial levels in the lives of urban dwellers. New insights thus gained can serve to broaden the perspective of both science and decision makers with regard to the planning and management of green spaces both inside and outside the city.

4.1. A portfolio of natural places

In this paper we have made a first attempt to empirically explore whether urban dwellers have a portfolio of natural places and to describe what such a portfolio of places of urban residents looks like. Our results demonstrate that the idea of a 'portfolio of places', as coined by Natural England (2009) in a qualitative study with rural residents, can also apply to people living in urban areas. The results of our study are summarised in Fig. 4 and substantiate the idea of a portfolio. It shows that the favourite natural places at different spatial levels play different roles, but at the same time are significant in their own right. The figure demonstrates that urban residents have favourite places nearby which are, when looking at the lower average rating, 'less special', but which are nevertheless places they visit frequently. Moreover, they have natural places which they find really attractive, but these are located farther away and visited less often. The local place offers access to the basic quality of 'green, nature', whereas preferred natural places at higher spatial levels offer varied qualities and more recreational options. 'Variation in the landscape' was found to be an important feature of natural places at higher spatial levels.

4.2. Wellbeing aspects of the portfolio

The health and wellbeing benefits of green spaces are in the literature often related to the restorative effects of nature through simply occupying or viewing nature (e.g. Pretty, Peacock, Sellens, & Griffin, 2005), to offering a place for physical activities (Wolf & Wohlfart, 2014) or to providing opportunities for social interaction (Coley et al., 1997). Our approach may raise more questions here than it answers: how do the health and wellbeing benefits inter-act, compensate add-up? Do they differ substantially as to the time span in which they have impacts? Do the different places in the portfolio differ in terms of the 'mechanism' through which they have an impact on health and wellbeing (Joye & Van den Berg, 2011)? However, at this point we can highlight and discuss a few observations.

Looking at the open answers of respondents regarding their views on the attractiveness of their marked places, quite some of the same elements were repeated for all spatial levels, particularly 'nature, green, water, animals, seasons, and view'. The idea of relaxing and the experience of quietness were also emphasised at all spatial levels. A connection to childhood and other memories of the past played a part too. However, after having examined the differences between the four spatial levels, we can observe that local and regional level favourite places are indeed crucial for counterbalancing the stressful effects of brought to bear by population density and the high energy hustle of many urban environments. Places at local and regional level in particular offer opportunities for physical and food-related activities, including picnicking and barbecuing.

<p>Local place</p> <p>Rated on average 7,7</p> <p>2 km from home</p> <p>Most often visited weekly or monthly</p> <p>Important quality: Green, nature</p> <p>Physical activities, relaxing and nature watching</p> <p>Counterbalance to the hustle of urban life</p> <p>Place for physical activities, picnicking</p>	<p>Regional place</p> <p>Rated on average 8,1</p> <p>13 km from home</p> <p>Most often visited monthly/few times a year</p> <p>A larger variety of natural qualities</p> <p>Walking, relaxing, nature watching and café/terrace</p> <p>Counterbalance to the hustle of urban life</p> <p>Place for physical activities, picnicking</p>
<p>National place</p> <p>Rated on average 8,4</p> <p>276 km from home</p> <p>Most often visited few times a year or yearly</p> <p>A higher natural and landscape quality and recreational options</p> <p>Walking/swimming, relaxing, nature watching, café/terrace</p> <p>Deeper, more intense feelings</p>	<p>World place</p> <p>Rated on average 8,6</p> <p>3361 km from home</p> <p>Most often visited yearly or rarely</p> <p>A higher natural and landscape quality and recreational options</p> <p>Walking/swimming, relaxing, nature watching, café/terrace</p> <p>Deeper, more intense feelings</p>

Fig. 4. A portfolio of natural places of urban residents.

And although the local place can evoke intense feelings, we found that places marked at national or world level stir deeper feelings and experiences. This is portrayed in respondents' open answers: descriptive adjectives such as 'fantastic', 'unique' and 'most beautiful' were used more often. The aspect of variation also emerges from the open answers, in which at national and world level several times returns that different activities can be undertaken or that several different landscape types come together.

4.3. Compensate or complement?

The 'portfolio of places' discussed here demonstrates that green space at different spatial levels and at different distances plays a role in the wellbeing of urban dwellers. The relationship between the use of local and more distant green space has been studied in the scientific literature, but until now has been viewed mostly in terms of the compensation hypothesis. The empirical results are mixed, some studies found support for it, others didn't (see also Hall & Page, 2014; Strandell & Hall, 2015). Our findings suggest that the use of local and more distant green space by urban residents could also be viewed in a more complementary way. With the natural places at different spatial levels serving different needs, it seems unlikely that it is possible to sufficiently compensate for the more basic and frequent 'nature needs' with only an occasional visit to distant nature. This idea is also supported for instance by Korpela, Ylén, Tyrväinen, and Silvennoinen (2008), who find a strong positive relationship between the visiting frequency of the favourite natural place within the everyday living environment, and the level of psychological restorative effects. It also implies the argument the other way around: that not all nature needs can be satisfied within or nearby the city. Strandell and Hall (2015) argue from a sustainability point of view that "cities should be able to satisfy the needs for nature-relationship and cottage traditions sustainably" (p. 22) by promoting the quality of the living environment in urban planning. Our results provide some support for this, but we would also assert that the 'blow your mind' experiences and the variation of

favourite places at national and world level are likely to be difficult to accomplish within the urban context.

4.4. The role of scale

We began the present paper with a main concern raised by Matsuoka and Kaplan (2008) in their review of people's needs in the urban landscape: "With the rapid urbanization of the countryside around the world, it is important to examine issues of scale in terms of human benefits. There is a tension between protecting large-scale tracts of land and providing small areas that afford frequent nature opportunities (p. 15)." Based on our results, we can conclude that scale plays a role in two respects. Firstly, our findings indicate that urban green space, peri-urban areas and natural areas located at larger distances from the city serve different needs for urban residents and play different roles in their wellbeing. Therefore, from a policy perspective one could argue that small, accessible green spaces as well as larger nature parks require and deserve management and conservation efforts, in particular in the context of an increasingly urbanising world. Furthermore, since every land-use conservation choice needs societal support, it may be worthwhile to explore how the strong connection between urban residents and nature areas located outside cities, verified here, could be used in order to generate (financial) support for the conservation of these areas (see also Bijker, Mehnen, Sijtsma, & Daams, 2014).

Secondly, our results point to the importance of scale in another respect. The portfolio of natural places, which is important for the urban residents in our sample living in urban areas in Germany, Denmark and the Netherlands, includes places located on average around 300 km at national level, and 3000 km at world level, far exceeding the boundaries of an urban area. The implication here is that governance of green spaces may need to be organised at a much larger scale than city level; this may involve cooperation between city networks, but it also supports planning and decision making on green infrastructure at national and European level.

4.5. Urban dwellers' need for nature in a globalised world

Finally, in their review Matsuoka and Kaplan (2008) state: “with the world evermore urbanized, a focus on meeting human needs in the urban context is vital (p. 8)”. Our results here suggest that in order to meet the needs of the urban dweller, it is necessary for urban planners to consider more than the immediate urban context. We have shown in the present paper that, in addition to urban green space, nature areas farther away are also part of urban dwellers' lives and thus play a major role in their well-being. The favourite place at world level, located on average 3.000 km from their home, is visited by around one-third of the respondents at least yearly. This finding corresponds with the renewed attention being given to the concept of ‘mobility’ (see e.g. Urry, 2000) in the context of an increasingly interconnected and interdependent globalising society (McIntyre, 2006). Mobility can be viewed as ‘the means by which people optimise access to their network of activities in various life domains: work, leisure, health, education, family, etc.’ (Bell & Ward, 2000, p. 104). Urban planners need to recognise and address these diverse mobilities and the complex networks of people and places, also with regard to the use of green space.

Our findings here are not intended to provide definitive answers on the relation between urban wellbeing and nature; the aim has been to provide a springboard to an approach that builds on the concept of a portfolio of natural places. We think that future research into the relationship between green space and wellbeing in urban areas from the perspective of a ‘portfolio of places’ is a fruitful approach, as it would indeed delve more deeply into the “need to understand people’s leisure mobility over the full range of their consumption” (Strandell & Hall, 2015, p. 22). Moreover, to explore this approach more comprehensively, researchers should include in their studies the full range of data investigating the use and appreciation of nature at different spatial levels. We have made a first attempt using these types of data to explore the ‘portfolio of natural places’ of urban dwellers at an aggregate level. It would be interesting, however, to take a next step and analyse the nature portfolio at the individual level. People living in urban areas are certainly not a homogenous group, there are social inequalities related to access to green infrastructure and their impacts (Mitchell & Popham, 2008), therefore it would also be relevant to investigate the extent to which the idea of a ‘portfolio of places’ holds true for different groups of urban residents.

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